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Cu/Cu oxide growth on ZnO and TiO₂ for CO₂ reduction FEI WANG, ZIYU ZHANG, RICHARD KURTZ, PHILLIP SPRUNGER, Louisiana State University — Monolayer copper growth on ZnO(10-10) and TiO₂(110) have been studied with STM, EELS and LEED. These systems are attractive due to their photochemical and electrochemical reduction of CO₂. However, determination of the particular reaction pathway(s) has been elusive because final reduction products strongly depend on the coverage and size of Cu clusters. In order to detangle substrate effects, single crystal ZnO(10-10) and TiO₂(110) have been chosen as supports for Cu growth. STM is employed to investigate the nucleation and growth of Cu on both substrates. Cu tends to grow nanoclusters on both substrates with preferred nucleation sites and directions. Upon annealing, Cu clusters ripening have been seen on ZnO substrate but not on TiO₂. Subsequent oxidation of Cu clusters is also studied with STM. CO₂ vibrational modes on both substrates will be studied with EELS.

Fei Wang
Louisiana State University

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